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[Grass and Forage Plant Investigations.]

THE VELVET BEAN.

(*Mucuna utilis.*)

The velvet bean has within the past three or four years attracted a good deal of attention in the Southern States. It is probable that very few forage or other farm plants have spread so rapidly during so short a time. The uniformly favorable reports regarding its value in the South may be taken as an indication of the remarkable interest shown by farmers throughout the land in the more extended cultivation of leguminous crops. Every one now knows that the legumes, including such plants as the clovers, alfalfa, beggar weed, cowpeas, and velvet bean, are capable of enriching the land on which they are grown because they are fitted by the tubercles on their roots to absorb nitrogen from the air, while other crops, such as the cereals, grasses, sorghum, and sugar cane, must have nitrogen provided for them. Because of this ability to manufacture fertilizers, leguminous crops are of great importance in the renovation and building up of worn or sterile soils.

ORIGIN OF THE VELVET BEAN.

The velvet bean is apparently a native of India and has been in cultivation as an ornamental garden plant for a good many years. It is believed to have been first introduced into this country by the Department of Agriculture for this purpose about twenty-five or thirty years ago. In favorable localities it often forms vines 30 to 50 feet in length. It is an excellent plant for quickly covering unsightly objects or arbors. The purple flowers are borne in clusters at intervals of 2 or 3 feet at the joints of the stem. These are followed by clusters of short, cylindrical pods, covered with a black, velvety down which has given the name to the plant. Each pod contains 3 to 6 large, rounded, brown and white mottled seeds. The pods are constricted laterally between the seeds and are often more or less curved.

The value of the velvet bean as a forage plant was accidentally discovered about six or eight years ago. Being a native of the tropics it only matures seed in Florida and the lower half of the States immediately along the Gulf coast. It will probably not ripen seed north of a line drawn from Columbia, S. C., 150 or 200 miles back from the coast to San Antonio, Tex. Wherever it ripens seed it is considered to be equal or superior to cowpeas, but where seed must each year be purchased it does not equal that crop.

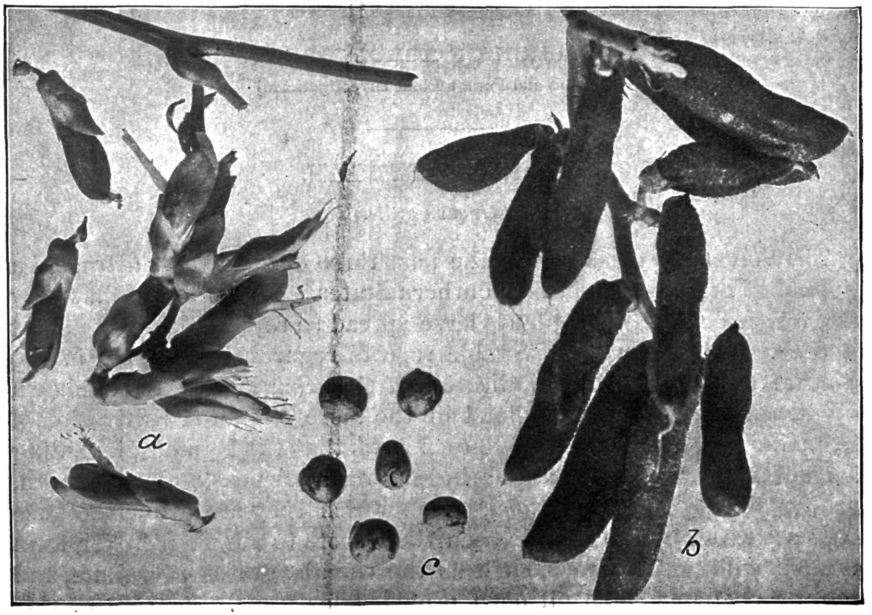

FIG. 1.—Velvet bean: *a* flowers, *b* pods, and *c* beans.

SEEDING.

In Florida the seed is sown in drills 4 feet apart, dropping from two to four seeds in hills 2 feet apart in the row. The seed may be dropped in furrows when the ground is plowed, and covered 2 or 3 inches deep. The crop should be cultivated several times. In orange groves and orchards the beans may be sown in drills 4 or 5 feet apart and not less than 5 feet away from the trees in order to keep the vines out of them. They make a better mulch crop in the orchard than the cowpea because when the vines are cut down by frost they form a tangled mass which retains the leaves and protects the soil from rain and sun. The leaves stay on the vines longer than on cowpeas. Farther north the seeds should be sown thicker in drills 2 or 3 feet apart, or broadcast at the rate of 1 or 2 bushels per acre. Its range of profitable cultivation does not extend beyond that of cotton and will not until its period of cultivation has been extended long enough to result in the origination of new varieties suited to a wider range of soils and climates.

FERTILIZERS.

Velvet bean makes its best growth on the lighter, sandy soils. While capable of increasing the amount of nitrogen it requires a liberal dressing of phosphoric acid and potash in the form of superphosphates and muriate or sulphate of potash. It pays to feed the crop well because on rich ground the gain of nitrogen through the increased crop of vines is more than proportionate to the added cost of the potash and phosphoric acid.

YIELD.

The yields of hay are about the same as for the best varieties of cowpeas on similar soils. The plant grows looser and bulkier and looks as though it would yield twice as much hay as the cowpea, but experi-

FIG. 2.—Velvet bean, showing leaves, flowers, and young pods. Grown in grass garden, Department of Agriculture, Washington, D. C.

ments conducted at the Alabama Experiment Station prove that the superiority in this regard is only apparent. The reported yields range from 2 to 4 tons of hay per acre, or more in Florida, where two or three cuttings are made during one season. Farther north the crop has not the same recuperative ability and can only be cut once. The yield of seed amounts to from 20 to 25 or 28 bushels per acre, about the same as for the most prolific varieties of cowpeas.

FEEDING VALUE.

The beans have a high feeding value, as shown by analyses made by the Florida Experiment Station. The air-dried shelled beans contain 6.29 per cent fat, 18.81 per cent crude protein, and 53.5 per cent non-nitrogenous extract. Cowpeas contain 51.4 per cent fat, 55.7 per cent non-nitrogenous extract, and 20.8 per cent crude protein; the peanut 39.6 per cent fat, 15.6 per cent non-nitrogenous extract, and 27.9 per cent crude protein; while soy beans contains 16.9 per cent fat, 28.8 per cent non-nitrogenous extract, and 34 per cent crude protein. Digestion experiments have not been made either with the hay or seeds. Judging from the chemical analyses, they are about equal in feeding value to cowpeas, but are of less value than either peanuts or soy beans. An analysis of velvet bean hay made at the North Dakota Experiment Station

FIG. 3.—Velvet bean in an orange grove near Earleton, Fla. Seed sown in drills 5 feet apart. Photographed August, 1898.

showed 5.3 per cent crude fat, 16 per cent crude protein, 20.7 per cent crude fiber, and 41.8 per cent nonnitrogenous extract. The plants were just commencing to flower at the time the analysis was made.

VALUE OF FERTILIZER.

Comparative analyses of the vines, fallen leaves, and roots of the velvet bean, Spanish peanut, and "unknown" cowpea were made at the North Louisiana Experiment Station to determine the amount of fertilizers contained in each crop. For the velvet bean 4,113 pounds of vines and leaves contained 93.4 pounds of nitrogen, worth $14; 3,382 pounds of fallen leaves contained 58.2 pounds, worth $8.73, and 173 pounds of roots without any stubble contained 2.7 pounds, worth 40

cents, making a total of 154.2 pounds of nitrogen in the velvet beans produced on 1 acre of ground, worth $23.13. An acre of peanuts contained 193 pounds of nitrogen, worth $28.95, while the 108.5 pounds of nitrogen in an acre of cowpeas was worth $16.26. Similar analyses have been made at the Alabama Experiment Station. Here a yield of 8,240 pounds of cured vines and fallen leaves and 1,258 pounds of roots, including about 3 inches of stubble, contained 201 pounds of nitrogen, worth, at 15 cents per pound, $30.15. There was 2.29 per cent nitrogen in the cured vines and 1 per cent in the air-dried roots.

Experiments were also made at the Alabama Station to determine the value of the velvet bean as a fertilizer, judging from the yield of succeeding crops of oats and sorghum. The increased yield of sorghum fodder was 3,272 pounds per acre over the yield on the plat which had not been cropped the previous year—something over 1½ tons, valued at $12. The yield of oats grown on land where velvet bean stubble had been plowed under was 38.7 bushels, and where velvet bean vines were used 28.6 bushels, while land on which a crop of crab grass and weeds had been plowed under only yielded 7.1 bushels, an average gain of 26.5 bushels of grain as a result of growing velvet beans on the land the previous year. The average gain was about the same when cowpeas were grown.

It is harder to plow under a crop of velvet beans than one of cowpeas, on account of the tangled mass of vines. It is necessary to use a rolling cutter, unless the farmer has a disk plow. At the Alabama Experiment Station it was found that as good results were obtained from plowing under the stubble as from plowing under a full crop of vines. As a general rule, it may be considered a wasteful practice to turn under the entire crop, because the feeding value of any leguminous crop is always greater than its fertilizing value. A greater profit can be secured in the form of marketable meat products without materially lessening the influence of the leguminous crop on the succeeding one in rotation.

USE OF THE BEANS FOR FOOD.

Velvet beans have been used to some extent as human food. The general opinion, as expressed by correspondents of the Southern agricultural papers, is that they are richer and less palatable than cowpeas.

The seeds are large, difficult to thrash, and the pod does not break up readily. Special machines have been constructed for the purpose of cleaning them. For feeding purposes it is a good idea to grind them up, pods and all, thus saving the expense of thrashing. The meal may be used as a concentrated feeding stuff in the same manner as cottonseed meal. It is said that cattle, sheep, hogs, and poultry are all very fond of them, but horses apparently do not relish them.

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Approved:
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